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Highly Cited Works on Covid-19 Vaccine: A Scientometric Mapping of Publications

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Abstract

This paper attempts to highlight the growth and development of Covid-19 Vaccine literature and make the quantitative and qualitative assessment by way of analyzing various features of research output and Citations impact based on the Web of Science database. A total of 433 publications were published on Covid-19 Vaccine, which received 52567 Citations during 1989-2020. The average number of citations per publication was 121.4. The research was peaked in 2020 with 97(Which received a minimum of 500 Citations) Publications and the highest number of citations (14623) were received in 2020. USA had the highest share 229 of publications and received 29027 Citations followed by the Peoples Republic of China with 13798 Citations for 114 publications, the UK with 4314 Citations for 35 publications, Germany with 3404 Citations for 33 publications, the Netherlands with 28 Citations for 28 publications. The study found that India has recorded 705 Citations for 9 Publications. The highly productive Institutions were: National Institute of Allergy and Infectious Diseases from the USA with 39 publications and received 6076 Citations followed by University N Carolina- the USA with 31 publications and 4118 citations, University Hong Kong- China with 23 publications and 3546 citations, New York Blood Centre with 21 publications and 2931 citations. The highly productive (Citations) journals are JOURNAL OF VIROLOGY with 5724 Citations for 53 Publications, SCIENCE with 4163 Citations for 13 publications, PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA with 3113 Citations for 20 publications, NATURE with 2250 Citations for 13 publications, and LANCET with 1528 Citations for 8 publications. This may be attributed to a new field for research to demystify the phenomena of Covid-19 Vaccine. There were 18 single Author publications by the scientists and 2906 multi-Author collaborative publications. The Collaboration Index is 7.05 and Citing Articles 15055.

Keywords: Covid-19 Vaccine, Scientometric, Citation, Research Collaboration

INTRODUCTION

Scientometric evaluations have its own characteristics. Scientometric researchers are exploring features of information processes in scientific research but are far from finding the solution to all problems. Scientometric studies covering all quantitative and qualitative aspects of the science of science also include quantitative and qualitative analysis of scientific literature (bibliometrics) as a reflection of science development and state-of-the-art compared science to an edifice building upon the past, and indicated the potential for examining science through its literature, since published papers being the end product of much science research and its "building blocks" show the structure of this "edifice." Many Scientometric studies have appeared in the literature to focus on the performance of Covid-19 Vaccine.

OBJECTIVES

The objective of the study was to perform a Scientometric analysis of all Covid-19 Vaccine publications in the world. The parameters studied include:

- To find out growth of Publications and Citations;
- To find out country-wise distribution of publications and Citations;
- To verify H-Index, G-Index and M-Index;
- To find out publications share of highly productive countries
- To find out publication and citations according to number of collaborating countries (Single Country and Multiple Country;
- To find out highly cited publications;
- To find out highly preferred journals and
- To document quality of research output;

MATERIALS AND METHODS

Web of Science database was used for retrieving data on Covid-19 Vaccine for all years using the search term 'Covid-19 Vaccine' or 'Coronavirus Vaccine' in 'topic' field. Records pertaining to Covid-19 Vaccine were retrieved only from 1989 onwards. A total of 433 publications and 52567 Citations received to these publications were transferred to spread sheet application, Biblioshiny, Histcite, and analyzed the data as per objectives of the study.

Geographical wise distribution of Publications and Citations

In all, there were 51 countries involved in research in Covid-19 Vaccine, which received at least 50 Citations per paper. The publication share of highly productive and Highly Cited Works Countries (≥50 Citations) on Covid-19 Vaccine is given in Table 1. USA had the highest share 229 of publications and received 29027 Citations followed by Peoples Republic of China with 13798 Citations for 114 publications, UK with 4314 Citations for 35 publications, Germany with 3404 Citations for 33 publications, Netherland with 28 Citations for 28 publications. The study found that India has recorded 705 Citations for 9 Publications. It is also noted that 10 countries are registered nearly 1000-3000 Citations and 18 Countries with single publication and received 50-200 Citations.

Table 1: Most Cited Country on Covid-19

	Publication Impact			Citation Impact		
	Country	**Records**	**TGCS**	**Country**	**Records**	**TGCS**
1	USA	229	29027	USA	229	29027

2	Peoples R China	114	13798	Peoples R China	114	13798
3	UK	35	4314	UK	35	4314
4	Germany	33	3404	Germany	33	3404
5	Netherlands	28	3007	Canada	23	3353
6	Canada	23	3353	Netherlands	28	3007
7	Spain	18	1922	France	17	2864
8	Switzerland	18	1990	Switzerland	18	1990
9	France	17	2864	Spain	18	1922
10	South Korea	14	1188	South Korea	14	1188
11	**India**	**9**	**705**	Australia	7	944
12	Saudi Arabia	9	806	Saudi Arabia	9	806
13	Taiwan	8	757	Singapore	7	798
14	Australia	7	944	Taiwan	8	757
15	Italy	7	499	**India**	**9**	**705**
16	Singapore	7	798	New Zealand	2	656
17	Japan	6	382	Thailand	4	630
18	Unknown	6	407	Finland	2	587
19	Belgium	4	302	Poland	3	557
20	Iran	4	332	Norway	3	555
21	Thailand	4	630	Italy	7	499
22	Ireland	3	184	South Africa	3	495
23	Israel	3	370	Unknown	6	407
24	Norway	3	555	Japan	6	382
25	Poland	3	557	Israel	3	370
26	Qatar	3	345	Qatar	3	345
27	South Africa	3	495	Iran	4	332
28	Sweden	3	313	Sweden	3	313
29	Egypt	2	111	Belgium	4	302
30	Finland	2	587	Mexico	2	226
31	Malaysia	2	108	Kenya	1	198
32	Mexico	2	226	Ireland	3	184
33	New Zealand	2	656	Egypt	2	111
34	Argentina	1	79	Malaysia	2	108
35	Austria	1	76	Czech Republic	1	104
36	Brazil	1	67	Pakistan	1	91
37	Chile	1	69	Argentina	1	79
38	Colombia	1	54	Iraq	1	79
39	Czech Republic	1	104	Jordan	1	79

40	Hungary	1	74	U Arab Emirates	1	79
41	Iraq	1	79	Austria	1	76
42	Jordan	1	79	Hungary	1	74
43	Kenya	1	198	Chile	1	69
44	Nigeria	1	50	Brazil	1	67
45	Pakistan	1	91	Turkey	1	64
46	Palestine	1	63	Palestine	1	63
47	Portugal	1	57	Portugal	1	57
48	Russia	1	54	Ukraine	1	55
49	Turkey	1	64	Colombia	1	54
50	U Arab Emirates	1	79	Russia	1	54
51	Ukraine	1	55	Nigeria	1	50

Table 2: Country Collaboration

From	To	Frequency	From	To	Frequency
USA	CHINA	50	AUSTRALIA	SWITZERLAND	2
USA	SWITZERLAND	14	CANADA	CHINA	2
USA	UNITED KINGDOM	13	CANADA	SPAIN	2
USA	NETHERLANDS	10	CANADA	SWITZERLAND	2
GERMANY	NETHERLANDS	9	CANADA	UNITED KINGDOM	2
CANADA	USA	8	CHINA	AUSTRALIA	2
USA	FRANCE	8	FRANCE	BELGIUM	2
CHINA	UNITED KINGDOM	7	FRANCE	GERMANY	2
USA	GERMANY	7	GERMANY	IRELAND	2
USA	SPAIN	7	GERMANY	MEXICO	2
UNITED KINGDOM	GERMANY	6	GERMANY	SWITZERLAND	2
USA	SAUDI ARABIA	6	INDIA	IRAN	2
CHINA	GERMANY	5	NETHERLANDS	IRELAND	2
USA	AUSTRALIA	5	SWITZERLAND	SAUDI ARABIA	2
USA	KOREA	5	THAILAND	INDIA	2
FRANCE	CHINA	4	THAILAND	IRAN	2
UNITED KINGDOM	SWITZERLAND	4	UNITED KINGDOM	NETHERLANDS	2
CANADA	FRANCE	3	USA	EGYPT	2
CHINA	JAPAN	3	USA	POLAND	2
CHINA	SINGAPORE	3	USA	QATAR	2
CHINA	SWITZERLAND	3	AUSTRALIA	NETHERLANDS	1
FRANCE	NETHERLANDS	3	AUSTRALIA	SAUDI ARABIA	1
FRANCE	SWITZERLAND	3	BELGIUM	CZECH	1

				REPUBLIC	
FRANCE	UNITED KINGDOM	3	CANADA	BELGIUM	1
UNITED KINGDOM	SAUDI ARABIA	3	CANADA	CZECH REPUBLIC	1

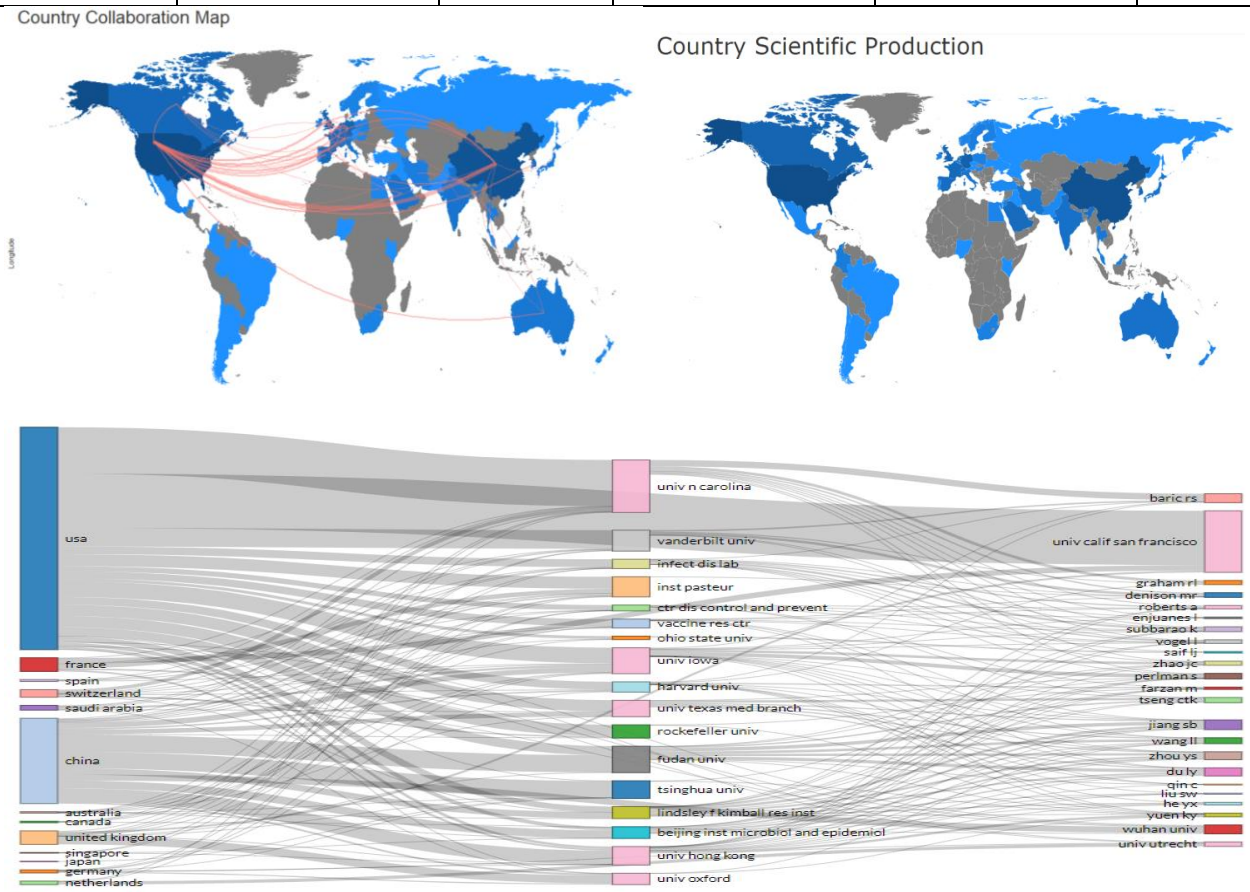
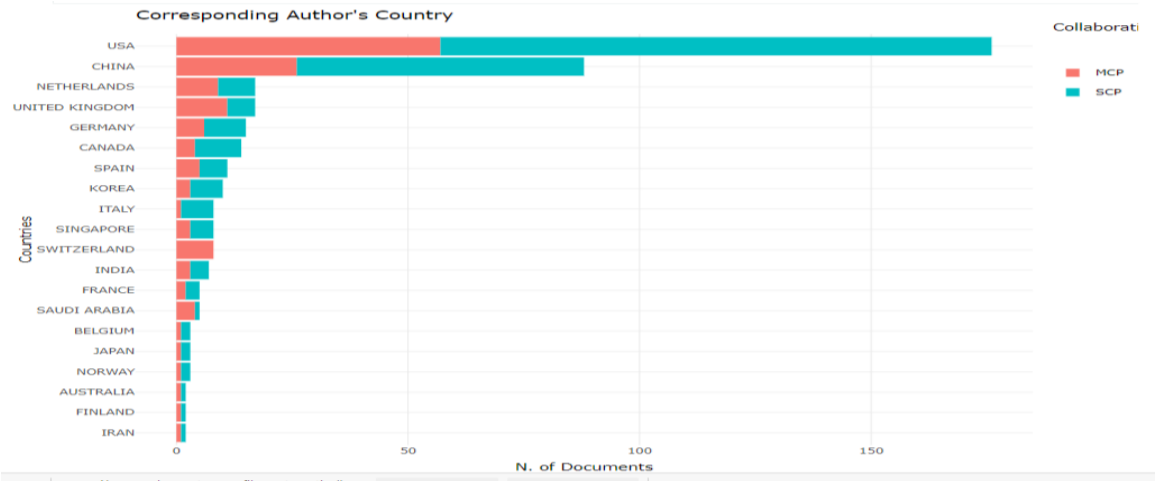


Figure: Three Field Plot (Countries, Institutions and Authors)

Table 3: Single Vs Multiple Country Collaboration

Country	Articles	Freq	SCP	MCP	MCP_Ratio
USA	176	0.41608	119	57	0.324
CHINA	88	0.20804	62	26	0.295
NETHERLANDS	17	0.04019	8	9	0.529
UNITED KINGDOM	17	0.04019	6	11	0.647
GERMANY	15	0.03546	9	6	0.4
CANADA	14	0.0331	10	4	0.286
SPAIN	11	0.026	6	5	0.455
KOREA	10	0.02364	7	3	0.3
ITALY	8	0.01891	7	1	0.125
SINGAPORE	8	0.01891	5	3	0.375
SWITZERLAND	8	0.01891	0	8	1
INDIA	7	0.01655	4	3	0.429
FRANCE	5	0.01182	3	2	0.4

SAUDI ARABIA	5	0.01182	1	4	0.8
BELGIUM	3	0.00709	2	1	0.333
JAPAN	3	0.00709	2	1	0.333
NORWAY	3	0.00709	2	1	0.333
AUSTRALIA	2	0.00473	1	1	0.5
FINLAND	2	0.00473	1	1	0.5
IRAN	2	0.00473	1	1	0.5
IRELAND	2	0.00473	0	2	1
MALAYSIA	2	0.00473	1	1	0.5
SOUTH AFRICA	2	0.00473	2	0	0
SWEDEN	2	0.00473	0	2	1
THAILAND	2	0.00473	2	0	0
AUSTRIA	1	0.00236	1	0	0
CHILE	1	0.00236	0	1	1
COLOMBIA	1	0.00236	0	1	1
EGYPT	1	0.00236	0	1	1
ISRAEL	1	0.00236	1	0	0
JORDAN	1	0.00236	1	0	0
KENYA	1	0.00236	0	1	1
PAKISTAN	1	0.00236	1	0	0
PORTUGAL	1	0.00236	0	1	1



The highest number of collaboration by USA with China(50), Switzerland(14), UK(13), Netherland(10), France(8), Germany(7) and so on followed by Germany with Netherland(9), Ireland(2), Mexico(2) and Switzerland(2) Publications. The figure shows Corresponding author's Country i.e. Single Vs Multiple Country Collaboration. The MCP Ratio from 0.12 to 1 and also showing single country collaboration is high compare with Multiple Country Collaboration.

Institution wise distribution of Citations

Among Institutions, the highly productive Institutions were: National Institute of Allergy and Infectious Diseases from USA with 39 publications and received 6076 Citations followed by University N Carolina- USA with 31 publications and 4118 citations, University Hong Kong-China with 23 publications and 3546 citations, New York Blood Ctr with 21 publications and 2931 citations. USA and China Institutes are dominating in terms of Citation and Publications in the field of Covid-19 Vaccine research. 26 Institutes are recorded 1000 and above Citations.

Table 4: Most Cited Institutions

#	Institution	Records	TGCS		Institution	Records	TGCS
1	NIAID	39	6076		Vanderbilt University	11	1638
2	University N Carolina	31	4118		University Victoria	2	1523
3	University Hong Kong	23	3546		University Minnesota	8	1449
4	New York Blood Ctr	21	2931		British Columbia Canc Agcy	1	1374
5	Chinese Academy of Science	18	2788		British Columbia Ctr Dis Control	1	1374
6	Beijing Inst Microbiology & Epidemiology	18	2703		National Microbiology Lab	1	1374
7	Harvard University	14	2280		CNRS	5	1353
8	Inst Pasteur	9	2030		University Texas Austin	3	1330
9	University Washington	9	1966		Chinese Acad Med Sci	14	1325
10	University Iowa	20	1945		Fred Hutchinson Canc Res Ctr	2	1301
11	Fudan University	15	1801		Tsinghua University	7	1109
12	University British Columbia	5	1734		University Utrecht	9	1076
13	Ctr Dis Control & Prevent	13	1640		Childrens Hosp	3	1061

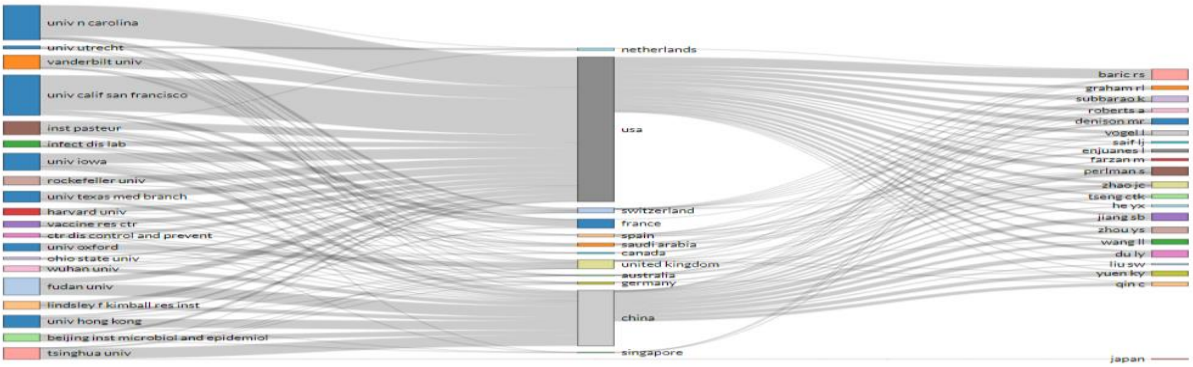


Figure: Three filed plot (Institutions, Countries and Authors)

Year wise distribution of Citations

Table 5 gives the year wise distribution of publications and Citations on Covid-19 Vaccine. Out of total 433 Publications, - the maximum numbers of Citations are in the year 2020 received 14623 Citations followed by 2004 with 5238 Citations for 39 publications, 4394 Citations in the year 2005. 15 Years registered the range of Citations 1045-14623. The below table 6 shows Average Citation Per year. The table 5 and 6 shows the year wise distribution of articles and the number of citations there of, total number of citations and average citations per article. From the table it has been found that there is a total of 52567 citations distributed among 159 journal. It is also seen that the number of articles is increasing but not in a uniform manner. Similarly, the number of citations per year is varying from year to year.

Table 5: Year wise distribution of Publications and Citations

#	Year	Records	TGCS		Year	Records	TGCS		Year	Records	TGCS
1	2020	97	14623		2008	17	1689		1997	3	228
2	2004	39	5238		2016	15	1437		1999	3	205
3	2005	39	4394		2011	9	1330		2001	1	164
4	2003	15	3296		2010	11	1158		2018	3	162
5	2014	28	2809		2009	9	1045		1993	2	160
6	2015	26	2637		2019	8	980		1995	1	153
7	2007	15	2192		2012	10	858		1998	2	130
8	2006	24	1983		2000	6	589		1994	1	66
9	2013	14	1755		2002	5	534		1992	1	54
10	2017	16	1699		1996	5	380				

Table 6: Average Citations per Year

Year	N	MeanTCperArt	MeanTCperYear	CitableYears
2020	97	150.7525773		0
2004	39	134.3076923	8.394230769	16
2005	39	112.6666667	7.511111111	15
2014	28	100.3214286	16.7202381	6
2015	26	101.4230769	20.28461538	5

2006	24	82.625	5.901785714	14
2008	17	99.35294118	8.279411765	12
2017	16	106.1875	35.39583333	3
2003	15	219.7333333	12.9254902	17
2007	15	146.1333333	11.24102564	13
2016	15	95.8	23.95	4
2013	14	125.3571429	17.90816327	7
2010	11	105.2727273	10.52727273	10
2012	10	85.8	10.725	8
2009	9	116.1111111	10.55555556	11
2011	9	147.7777778	16.41975309	9
2019	8	122.5	122.5	1
2000	6	98.16666667	4.908333333	20
1996	5	76	3.166666667	24
2002	5	106.8	5.933333333	18
1997	3	76	3.304347826	23
1999	3	68.33333333	3.253968254	21
2018	3	54	27	2
1993	2	80	2.962962963	27
1998	2	65	2.954545455	22
1992	1	54	1.928571429	28
1994	1	66	2.538461538	26
1995	1	153	6.12	25
2001	1	164	8.631578947	19

Journal wise distribution of Citations (159)

The scientific literature on Covid-19 Vaccine is spread over 159 different source journals. Table 7 gives the leading journals each with number of publications and number of citations. The highly productive (Citations) journals are: JOURNAL OF VIROLOGY with 5724 Citations for 53 Publications, SCIENCE with 4163 Citations for 13 publications, PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA with 3113 Citations for 20 publications, NATURE with 2250 Citations for 13 publications, and LANCET with 1528 Citations for 8 publications. Table 8 shows Source impact of top 10 source title are listed in terms of cumulative number. The study found that most of the publications are published in high impact Journals.

Table 7: Most Cited Journals (159)

Sl. No	Journal (CiteSCore)	Records	TLCS	TGCS
1	JOURNAL OF VIROLOGY – 7.9	53	483	5724
2	SCIENCE	13	154	4163
3	PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA-15.7	20	299	3113
4	NATURE	13	101	2250
5	LANCET	8	97	1528
6	VACCINE	18	134	1447
7	CELL	2	19	1251
8	AVIAN PATHOLOGY	9	49	1008
9	VIROLOGY	12	98	981
10	NATURE COMMUNICATIONS	6	0	974
11	NATURE MEDICINE	4	50	875
12	VIRUSES-BASEL	8	2	869
13	PLOS PATHOGENS	6	0	824
14	JOURNAL OF MEDICAL VIROLOGY	8	12	747
15	CLINICAL MICROBIOLOGY REVIEWS	3	9	714
16	BIOCHEMICAL AND BIOPHYSICAL RESEARCH COMMUNICATIONS	5	87	682
17	ARCHIVES OF VIROLOGY	8	14	674
18	JOURNAL OF GENERAL VIROLOGY	7	40	650
19	NATURE REVIEWS MICROBIOLOGY	2	61	624
20	VIROLOGY JOURNAL	5	0	612
21	JOURNAL OF INFECTIOUS DISEASES	7	22	574
22	EMERGING INFECTIOUS DISEASES	5	26	568
23	JOURNAL OF IMMUNOLOGY	6	68	556
24	JOURNAL OF VIROLOGICAL METHODS	6	8	555
25	SCIENCE TRANSLATIONAL MEDICINE	3	0	554

Table 8: Source Dynamic

Year	SCIENCE	JOURNAL OF VIROLOGY	LANCET	NATURE	PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES OF THE UNITED STATES OF AMERICA	JOURNAL OF MEDICAL VIROLOGY	VIRUSES-BASEL
1992	0	0	0	0	0	0	0
1993	0	0	0	0	0	0	0
1994	0	0	0	0	0	0	0
1995	0	0	0	0	0	0	0
1996	0	1	0	0	0	0	0
1997	0	2	0	0	0	0	0
1998	0	2	0	0	0	0	0
1999	0	2	0	0	1	0	0
2000	0	2	0	0	2	0	0
2001	0	3	0	0	2	0	0
2002	0	4	0	0	2	0	0
2003	1	6	2	0	3	0	0
2004	1	16	3	1	6	1	0
2005	2	21	3	1	9	1	0
2006	2	24	3	1	9	2	0
2007	3	26	3	1	11	2	0
2008	3	28	3	1	12	2	0
2009	3	28	3	1	12	3	0
2010	3	33	3	1	12	3	0
2011	3	36	4	1	12	3	0
2012	3	36	4	1	12	3	2
2013	3	40	4	1	13	3	3
2014	3	44	4	2	15	3	4
2015	3	51	4	2	16	3	4
2016	4	51	4	3	17	3	4
2017	4	51	4	3	20	3	4
2018	4	51	4	3	20	3	5
2019	4	51	4	3	20	3	5
2020	13	53	8	12	20	8	8

Most Cited Authors (2924)

Table 9 shows the ranking of authors / Citation received. In the rank list the contributors who have received more than 1500 Citations or more are taken into account to avoid a long list. Baric RS has contributed 24 articles (3232 Citations) and followed by Subbarao K contributed 20 articles(3071 Citations), Jiang SB contributed 23 articles(2668 Citations). Others have recorded less than 1500 Citations during the period of study. In the analysis it has been observed that most of the ranked contributors are from USA and China. The study found that 94 authors received more than 1000 Citations and 189 authors received more than 500 Citations. Table 10 shows impact of authors in terms of H-Index, G-Index and M-Index values.

Table 9: Most Cited Authors

#	Author	Records	TGCS		Author	Records	TGCS
1	Baric RS	24	3232		Perlman S	18	1759
2	Subbarao K	20	3071		Corbett KS	4	1636
3	Jiang SB	23	2668		Czub M	3	1628
4	Zhou YS	17	2600		Feldmann H	3	1611
5	Du LY	16	2396		Andonov A	3	1592
6	Yuen KY	12	2181		Jones S	3	1592
7	Roberts A	14	1980		Denison MR	10	1585
8	Graham BS	7	1959		Graham RL	9	1577
9	Li Y	7	1923		Farzan M	8	1572
10	Wang NS	5	1859		Li F	5	1544
11	Vogel L	13	1834		Grolla A	2	1533
12	McLellan JS	6	1811		Roper RL	3	1514

Table 10: Author Impact

Author	h_index	g_index	m_index	TC	NP	PY_start
BARIC RS	24	24	1.26	3232	24	2002
JIANG SB	23	23	1.35	2668	23	2004
SUBBARAO K	20	20	1.18	3071	20	2004
PERLMAN S	18	18	1.38	1759	18	2008
ZHOU YS	17	17	1.00	2600	17	2004
DU LY	16	16	0.94	2396	16	2004
ENJUANES L	14	14	0.56	1437	14	1996
ROBERTS A	14	14	0.82	1980	14	2004
VOGEL L	13	13	0.76	1834	13	2004
SAIF LJ	12	12	0.43	931	12	1993

YUEN KY	12	12	0.71	2181	12	2004
ZHAO JC	12	12	1.09	1298	12	2010
HE YX	11	11	0.65	1304	11	2004
DENISON MR	10	10	0.56	1585	10	2003

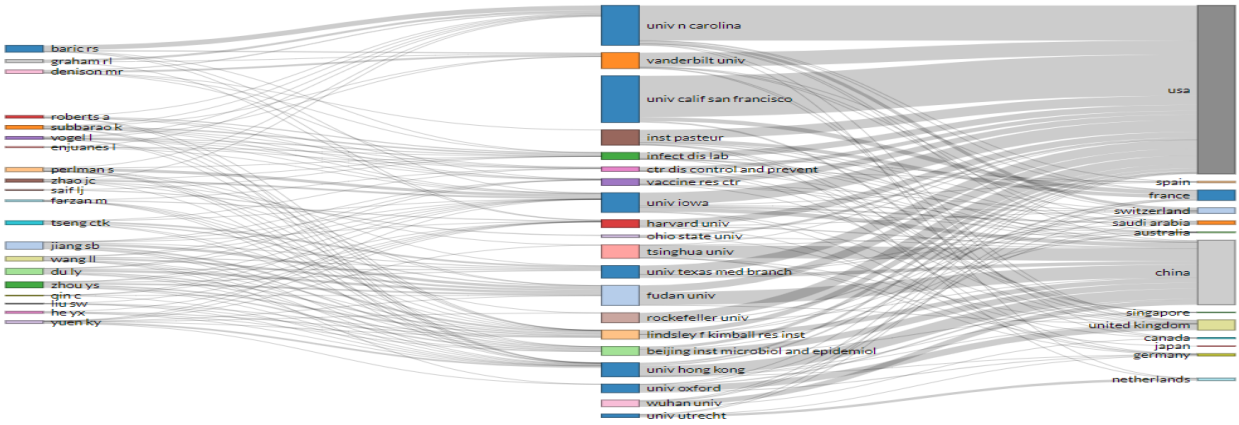


Figure: Three Field Plot (Authors, Institutions and Countries

Highly Cited papers

The highly cited 10 Covid-19 Vaccine publications during the period of study are listed in Table 11. The most frequently cited one was "Marra MA, Jones SJM, Astell CR, Holt RA, Brooks-Wilson A, et al., The genome sequence of the SARS-associated coronavirus, SCIENCE. 2003 MAY 30; 300 (5624): 1399-1404" with 1374 citations followed by Wrapp D, Wang NS, Corbett KS, Goldsmith JA, Hsieh CL, et al., Cryo-EM structure of the 2019-nCoV spike in the prefusion conformation, SCIENCE. 2020 MAR 13; 367 (6483): 1260-+ with 1202 Citations.

Table 11: Highly Cited Papers

#	Date / Author / Journal	GCS	CR	Country Collaboration	Authors	TC per Year
1	43 Marra MA, Jones SJM, Astell CR, Holt RA, Brooks-Wilson A, et al., The genome sequence of the SARS-associated coronavirus SCIENCE. 2003 MAY 30; 300 (5624): 1399-1404	1374	32	Canada	59	76.33
2	354 Wrapp D, Wang NS, Corbett KS, Goldsmith JA, Hsieh CL, et al., Cryo-EM structure of the 2019-nCoV spike in the prefusion conformation, SCIENCE. 2020 MAR 13; 367 (6483): 1260-+	1202	45	USA	8	1202
3	366 Walls AC, Park YJ, Tortorici MA, Wall A, McGuire AT, et al. Structure, Function, and Antigenicity of the	985	99	USA, France	6	985

	SARS-CoV-2 Spike Glycoprotein, CELL. 2020 APR 16; 181 (2): 281-+					
4	349 Wan YS, Shang J, Sun SH, Tai WB, Chen J, et al. Molecular Mechanism for Antibody-Dependent Enhancement of Coronavirus Entry, JOURNAL OF VIROLOGY. 2020 MAR; 94 (5): Art. No. e02015-19	705	64	USA, China	13	705
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6	211 Ruuskanen O, Lahti E, Jennings LC, Murdoch DR Viral pneumonia, LANCET. 2011 APR 9; 377 (9773): 1264-1275	520	152	Finland, New Zealand	4	52
7	89 Peiris JSM, Guan Y, Yuen KY., Severe acute respiratory syndrome, NATURE MEDICINE. 2004 DEC; 10 (12): S88-S97	469	147	China	3	27.59
8	162 Cavanagh D., Coronavirus avian infectious bronchitis virus VETERINARY RESEARCH. 2007 FEB-MAR; 38 (2): 281-297	444	103	England	1	31.71
9	59 Yang ZY, Kong WP, Huang Y, Roberts A, Murphy BR, et al. A DNA vaccine induces SARS coronavirus neutralization and protective immunity in mice, NATURE. 2004 APR 1; 428 (6982): 561-564	393	23	USA	7	23.12
10	190 Du LY, He YX, Zhou YS, Liu SW, Zheng BJ, et al. The spike protein of SARS-CoV - a target for vaccine and therapeutic development, NATURE REVIEWS MICROBIOLOGY. 2009 MAR; 7 (3): 226-236	391	143	USA, China	6	32.58

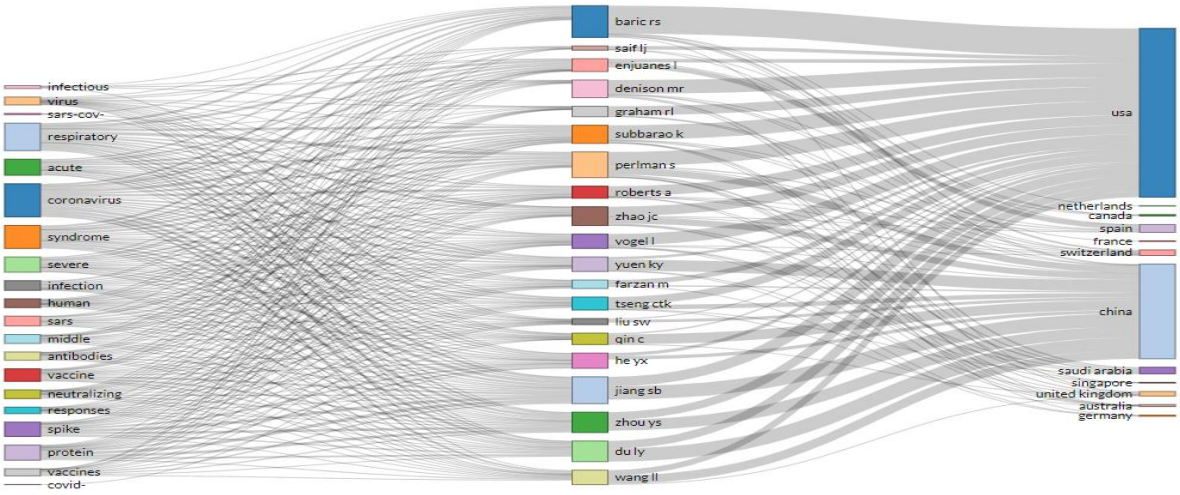

Figure: Three Field Plot (Titles, authors and Countries)

FINDINGS AND CONCLUSION

As per the Web of Science database, a total of 433 publications were published on Covid-19, which received 52567 citations during 1989-2020. The average number of citations per publication was 121.4. The research was peaked in 2020 with 97(Which received minimum 500 Citations) Publications, and the highest number of citations (14623) were received in 2020. The exponential growth of publications was observed. This may be attributed to a new field for research to demystify the phenomena of Covid-19 Vaccine. There were 18 single Author publications by the scientists and 2906 multi-Author collaborative publications. The Collaboration Index is 7.05 and Citing Articles (References) 15055.

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